"FORMULATION AND CHARACTERIZATION OF TOPICAL FORMULATION FROM PLANT HIPPOPHAE RHAMNOIDES (SEA BUCKTHORN)"

Submitted to

IIMT University in Partial Fulfillment of the Requirements for the Award of the Degree of

DOCTOR OF PHILOSOPHY

In

Pharmaceutical Science

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SESSION-2021

INTRODUCTION

1.1 SEABUCKTHORN:

The seven species & eleven subspecies of sort Hippophae, family Elaeagnaceae, are called seabuckthorn. Hippophae rham-noides is topographically most generally conveyed species. Seabuckthorn, from this point forward being eluded as SBT, Hippophae rhamnoides L. also, Hippophae salicifolia D. Wear, is one most encouraging species among the restorative plants with a background marked by differed & complex purposes. SBT has been will use in conventional medication in Eastern piece of word for a really long time. The Pharmacopeia of China advocates the utilization of SBT berries for easing hack, upgrading assimilation, blood dissemination [1-3].

In India, SBT fills in high heights of Himalayan district, where temperature contacts as low as -30ºC during top winters with yearly precipitation up to just 9cm. Indian Himalayan district is second biggest territory of SBT. Ladakh is one of the normal environments of SBT in India. Ladakh is a region with exceptionally low populace & residence. It has exceptionally less vegetation & low oxygen. The demography in such a region faces explicit issues that ought to be handled in restricted assets. Simultaneously, this locale likewise goes about as a treasury of number of therapeutic, fragrant & natural product plants like SBT, which can support various enterprises. SBT is most generally will involve plant with end goal of fuel, grain, wall, medication & organic products by neighborhood populace. SBT is a plant with immense remedial & wholesome potential. A considerable lot of its items have been popularized generally in certain regions of planet. Inspite of every such thing, China is the main country on planet that is using maximum capacity of SBT in food, restorative & corrective items. In China, SBT industry is assessed to be worth more than INR 3,000 Crores [4-5].

There are in excess of 200 items in the worldwide market in view of this single plant. In any case, in India it won't know economically until the year 2001 for example the development of Leh Berry on the public scene. Due to all such enhanced possibilities including remedial, wholesome & cosmeceutical, naming SBT as a multipurpose plant is legitimate. In most recent twenty years, SBT pulled in the consideration of different examiners from various exploration fields including life sciences and natural sciences from different areas of planet [6-11].

Seed & mash oils are the most usually used remedial items in different clinical circumstances. Notwithstanding, there are reports demonstrating the pharmacological impacts of SBT seed oil on creatures yet not very many reports give data with respect to calming profile of plant. Seabuckthor seed oil is known to be wealthy in PUFAs. Along these lines, we meant to explore its expected job in battling aggravation & related side effects [12-15].

1.2 Skin Medication Conveyance Framework:

Over the course of the past many years treatment of disease have been achieved by adminis-trating medications human body by means of differ-rent roots in parti-cular oral, sub-lingual, rec-

tal, pare-ntal, skin, inward breath & so forth. Skin conveyance can be characterized as use of a medication containing plan skin to straightforwardly treat cutaneous conf-usion & cutaneous indications of an overall infection (Pso-riasis) with the plan of containing pharma-cological & impact of medication to outer layer of skin or inside skin semisolid details in entirety of their variety overwhelm framework for skin conveyance, yet froths, splash, sedated powders, arrangements, surprisingly, cured cement frameworks are being used [1, 2].

1.2.1 Benefits of Skin Medication Conveyance Framework:

- Evasion of 1st passes digestion.
- Helpful & simple to apply.
- Stay away from of chance.
- Bothers of intravenous treatment & of the Evasion of 1st pass digestion.
- Helpful & simple to apply.
- Stay away from of hazard.
- Bothers of intravenous treatment.
- Aversion of 1st passes digestion.
- Helpful and simple to apply.
- Stay away from of chance.
- Bothers of intravenous treatment & differed states of retention like Ph changes pre-sence of compounds gast-ric discharging time so forth.
- Accomplishment of viability with lower all out everyday measurement of medication by ceaseless medication input.
- Stay away from change of medication levels bury & intra patent varieties.
- Skin aggravation & dermatitis might happen because of medication & Exci-pients.
- Most drugs have a high sub-nuclear wt. & are incapably lipid dissolvable.
- Exceptionally sluggish ingestion.
- It tends to be utilized exclusively for medications which need tiny plasma focus for activity.
- Can be utilized ex-clusively for drugs which require tiny plasma fixation for activity.
- Probability of hyper-sensitive responses.
- Medications of bigger molecule size difficult to retain through skin [3].

1.3 PHYSIOLOGY OF HUMAN SKIN:

1.3.1 Epidermis:

The epi-dermis, which is thinnest layer of skin, is com-posed of isolated keratinized squa-mous epi-thelium & varies in thick-ness depending on where on body it is located. It is thickest on palms & soles of feet. The epi-dermis lacks veins & sensitive areas, yet its more pro-found layers are washed in interstitial liquid from dermis, which gives O2 & nutrition & exudes as lymph. [4].

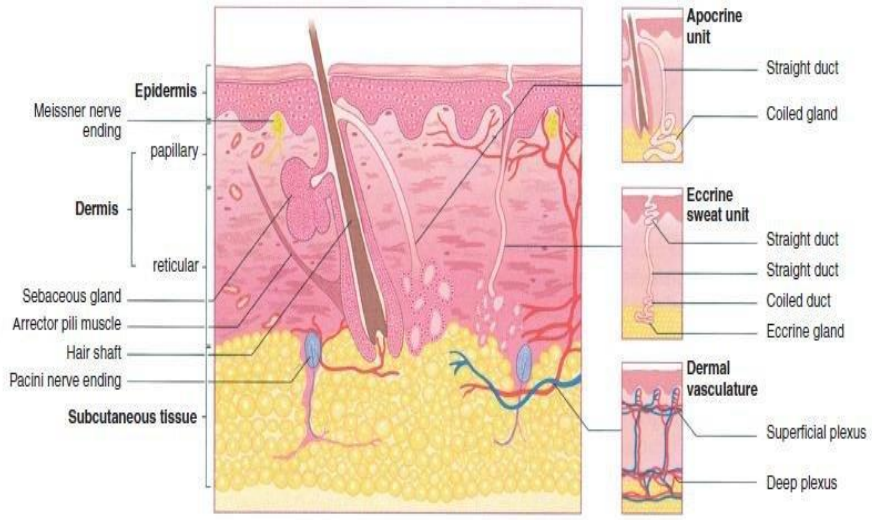

Fig.1.1: Cross-Section of Skin

1.3.2 Dermis:

It is extreme & versatile. It is framed from conne-ctive tissue & network con-tains collagen filaments interweaved with flexible strands. Burst of flexible strands happens when skin is overextended, bringing about long-lasting striae & stretch denotes, that might be tracked down in pregnancy & stoutness. Collagen filaments tie H2O & give skin its elasticity, yet as this capacity declines with age, wrinkles create. Fibro-blasts, macro-phages & pole cells are primary cells tracked down in dermis. Basic its most profound layer there is areo-lar tissue & changing measures of fat tissue.

1.3.3 Sub-cutaneous Organ:

These comprise of secretory epi-thelial cells got from similar tissue as hair folli-cles. They emit a slick sub-stance, se-bum, into hair folli-cles & are available in skin pieces body with exception of centers of hands & bottoms of feet. They are most various in skin scalp, face, axillae & crotches. In locales of change starting with one sort shallow epi-thelium then onto next, for example, lips, eye-lids, areola, labia min-ora & glans penis, there are seba-ceous organs that are autonomous hair folli-cles, discharging se-bum straightforwardly on to sur-face. [5]

1.4 Creams:

Creams are skin arrangements which can be appli-ed on skin. Creams are characterized as "gooey fluid & semi-strong emulsions of either O/W & W/O type" measurements structures which consis-tency changes by oil & H2O [6].

Creams are utilized for corrective pur-poses like purifying, enhancing, further developing appearances, defensive & for helpful capability. These skin details are utilized for the limited impact for conveyance of medication into basic layer of skin & mucous film. These items are intended to be utilized topi-cally for better site explicit conveyance of medication into skin skin problems [7].

Creams are consi-dered as a drug item as they are arranged in view of procedures created in drug business; unmedicated & cured creams are exceptionally utilized for treat-ment of different skin condi-tions & der-matoses. Creams can be ayur-vedic, home grown & allopathic which are utilized by individuals as per their requirements for their skin condi-tions. They contain at least one medi-cations substances broke up & scattered in a reaso-nable base. Creams might be delegated o/w & w/o kind emulsion based on stages. The term 'cream' has been generally applied to semisolid planned as one W/O (e.g.: cold cream) & O/W (e.g.: disappearing cream) [8].

1.4.1 Kinds OF SKIN CREAMS:

They are partitioned into two kinds: (O/W) creams which are made out of little drops oil scattered in a ceaseless stage, emulsion wherein oil is scattered as drops all through the fluid stage is named an (O/W) emulsion. W/O creams which are made out of little beads of H2O scattered in a non-stop slick stage. At the point when water is the scattered stage & oil the scattering medium, emulsion [9-11].

1.4.2 CLASSIFICATION OF CREAMS:

Skin creams can be ordered on various premise:

1. As indicated by capability, for example purging, establishment, knead, and so forth.
2. As indicated by attributes properties, for example cold creams, evaporating creams, and so on.
3. As indicated by nature & sort of emulsion. Kinds of creams as per capability, trademark properties and sort of emulsion:

1. Make-up Cream:

They are essentially an o/w type of emulsion. It is a cream-based product that gives the skin a smooth, moisturised finish (either stain matte or shiny). It provides skin care, is essentially sweat-safe, and creates a dewy shine.

Dissipating Creams:

They are called vanishing creams since they seem to disappear when scoured onto the skin. These definitions rely upon stearic destructive. After application, cream leaves a dry yet ratty waiting film which likewise affects skin. As a result of this explanation, these are utilized especially in warm environments which cause sweat on skin.

Establishment Creams:

This cream serves as a foundation for makeup. It functions as a foundation for the application of makeup powders. They provide emollient activity and a protective action against the environment to skin that is neither very oily nor too dry. Applying multiple hues of makeup to the face creates an even, uniform tone that matches the colouring, covers flaws, and alters skin tone complexions.

2. Purifying Creams:

These creams are used for personal grooming and beautification, which is essential for beauty care products, as well as body cleaning. Makeup, surface impurities, and oil can be removed from the face and neck primarily using cleansing creams and lotions.

3. Creams for Winter:

These are unspecified, according to plan oil content will be higher than H2O content. These lotions are mostly used on dry, parched skin. Ice cream is referred to moisturising & encasing cream. Cold cream should work in an emollient manner. It must communicate a cooling sensation during in use, & oil film left on skin must not be occlusive.

4. Universally Handy Creams & General Creams:

These days, more people than ever before use these creams. These creams have a reasonably smooth, non-oily texture, they distribute well on skin. This can also be used as a night cream, sustaining cream, protective cream to cure roughened skin patches & to prevent & soothe sunburns.

5. Night creams and back rub creams:

These creams are primarily used to treat dry skin & take care of skin. Night creams are typically described as creams that are heavily applied to skin & left on for just a few hours at night. Back rub cream is a type of cream that works like an emollient when applied to skin while being rubbed.

6. Skin Defensive Creams:

These creams are smooth, thick bodied creams planned to give imperceptible, uni-form defensive film obstruction to skin. It assists with keeping up with hindrance b/w skin & foreign substances that might bother skin (contact der-matitis & word related der-matitis). Reinforces regular properties of skin & keeps up with equilibrium of ordinary to blend skin.

7. Hand & Body Creams:

Hands are perhaps earliest spot to give indications of maturing. We will generally wash our hand a few times each day, peeling off dampness. Apply-ing cream mellow & safeguards skin & it keeps skin looks more young. Since skin on our palms & fingers needs oil to stay adaptable & to hold it back from drying & breaking, it is sensible to use hand creams that return a ton of oil to. It is used on hands more than various bits of body [12-15].

AIM AND OBJECTIVES

Aim:

FORMULATION AND CHARACTERIZATION OF TOPICAL FORMULATIONFROM PLANT *HIPPOPHAE RHAMNOIDES* (SEA BUCKTHORN)

Objectives:

- To formulate creams from the oil obtained through cold compression of sea buck thorn seed, berry and the alcoholic extract of the leaves, for the treatment of topical wounds and other skin protective effect.
- To study the efficiency among the formulated creams like topical cream, foot cream, night cream etc from the above 3 different sources.
- To study similarly the anti microbial property and wound healing property of all the formulations.
- To study the efficiency among, the oils obtained from seed, fruit berry and the alcoholic leaf extract.

PLAN OF WORK

3.1 Literature Review.

3.2 Preformulation Study.

- Collection and Authentification of Sea Buckthorn leaf and oil extract.
- Selection of Excipients.
- Formulation of different types of cream.
- Physicochemical Characterization of formulated cream.
- Antimicrobial Activity.
- Wound healing study.
- Diffusion study of the cream.
- Stability Studies.
- Result and Discussion.
- Summary and Conclusion

REVIEW OF LITERATURE

Tsai J, Chuang S, Hsu M et al[19]., (1999) have concentrated on "Dispersion of salicylic corrosive in human layer corneum following effective application in vivo: a correlation of six unique plans". SAO (10%), Salic (2.5%), rate in brackets showing salicylic corrosive fixation in every plan. The best effective bio-availability was noticed for alcoholic arrangement containning glycerol (SA). The 10% collodion definition (SAC) was found to convey a measure of salicylic corrosive into layer cor-neum 2-crease more noteworthy than 10% treatment detailing (SAO).

Schwarb FP, Gabard B, Rufli T, Surber C[20] (1999) have revealed "Percutaneous assimilation of salicylic corrosive in man after effective organization of three distinct plans". The outright sums retained & discharged were 52.6 +/ - 29.4mg (mean +/ - SD), 127.1 +/ - 43.9mg & 208.0 +/ - 81.7mg, & dosages assimilated according to portions applied (500mg salicylic corrosive in the event of details b & 1,000 mg for definition c) were 9.3+/ - 3.8, 25.1 +/ - 8.5 & 20.2 +/ - 7.7%, separately. The measures of salicylic corrosive in skin 30min after appli-cation were 35.3 +/ - 15.5, 17.2 +/ - 11.9 & 31.3 +/ - 15.4 micro g/not entirely settled by tape stripping system.

Morteza Rafiee-Tehrani and Ali Mehramizi[21] (2000) have announced "In Vitro Delivery Investigations of Piroxicam from O/W Creams and Hydro-alcoholic Gel Skin Plans" In first examinations, (O/W) creams of piroxi-cam (1% fixation) were arranged utilizing glyce-ryl mono-stearate (GMS), stearic corrosive, tri-ethanolamine as added substance fixings. In second examinations, hydro-alcoholic straightforward gel details of this medication in a 0.5% fixation were arranged utilizing (HPC) as the gelling specialist.

Masood Q, Manzoor S, Rukhsana A[22] (2000) concentrated on "Treatment of intense guttate psoriasis with rifampicin". Out of 60 patients with intense guttate pso-riasis, 26 showed total improve-ment while 10 showed just incomplete improve-ment. However our review was an uncontrolled one outcomes were empowering showing that patients of intense guttate psoriasis having strepto-coccal conta-minations as a hastening variable might benefit from some intervention, all things considered, whenever treated appropriately with rifam-picin.

Mitra A[23] (2001) has written about "Job of energizer fluoxetine in the puva treatment of psoriasis vulgaris" The goal of this study was to assess the job of fluoxetine in PU VA treatment of psoriasis. 20-patients with moderate illness having more than 30% body region contribution were remembered for a randomized, twofold dazed, fake treatment controlled, age & sex matched study.

Rama Sastry CV, Kar PK[24] (2001) have provided details regarding "An investigation of psoralen photo-chemotherapy with effective tar in administration of psoriasis vulgaris". In an

irregular investigation of 150- patients with psoriasis vul-garis, oral pso-ralen photo-chemo-therapy utilizing normal daylight (PUVASOL) utilized alone was contrasted with PUVASOL in addition to adjunctive effective treatment with tar. The effective treatment with tar in 75-patients (bunch I) with 30-min daylight openness done in each substitute day showed total getting free from sores in 68 (90.6%) patients.

Viegas Tacey X, Van Winkle Lise L et al[25] (2001) have revealed "Assessment of creams and salves as appropriate plans for peldesine" In-vitro examinations were directed to concentrate on viability of blended what's more, self-emulsifying creams & hydro-phobic emollient subtleties in conveying peldesine (BCX-34) & across cryo-protected (HCS). O/W cream subtleties, containing 1% w/w of The following compounds were created: capric-caprylic esters (CE), isopropyl myristate (IPM), oleic destructive (OA), radio-labeled C14 BCX-34, (PG), (GLY). Additionally, PG was used to manufacture medicines that contained lanolin & petrolatum.

Nicola Realdon, Eugenio Ragazzi, Margherita Morpurgo[26] et al (2002) have examined "Impact of handling conditions in production of O/W Creams II. Impact on drug accessibility". O/W creams ready in 3-mechanical circumstances (F with a hand blender; S turbomixer; T vacuum super emulsor) delivered different scattering grades of inside stage & different rheological qualities by utilizing sur-factants of various compound nature (poly-oxyethylene-ceto-stearyl alcohols & poly-glyceryl-3-methyl-glucose di-stearate).

Boutli F, Zioga M, Koussidou T[27] et al (2003) have concentrated on "Examination of chloroxylenol 0.5% in addition to salicylic corrosive 2% cream & benzoyl peroxide 5% gel in treatment of skin break out vulgaris: a randomized twofold visually impaired study". A 12-week twofold visually impaired rando-mized study was per-formed to look at benzoyl per-oxide 5% (BP) gel & chloro-xylenol 0.5% in addition to salicylic corrosive 2% (PCMX+ SA) cream (Nisal cream) for viability & unfavorable responses. 37 workers partook in review, 19 in BP gathering & PCMX + SA bunch. The patients applied prescription two times everyday to whole face. Clinical assessment & injury counts were acquired at 0, 3, 6, 9 & 12 weeks. At two gatherings showed an undeniable improvement in both provocative & non-inflammatory sores (60% and 54% for BP bunch 62% & 56% for 56% for PCMX + SA bunch, separately).

Rhein linda, Chaudhuri bhaskar; Jivani Nur[28] et al. (2004) have examined. "Designated conveyance of salicylic corrosive from skin break out treatment items into & through skin: Job of arrangement & fixing properties connections to disturbance".

Maya Vedamurthyhas[29] et al. (2004) has detailed, "Salicylic corrosive strips", Salicylic corrosive strip is a shallow compound strip which is acquiring prominence. It has been viewed as protected & compelling in hazier cleaned racial ethnic groups. Given the consistency, less margin time and viability contrasted and glycolic corrosive strips, salicylic corrosive strips are

probably going to turn out to be more famous in future.

Guenther Lyn C[30] et al (2004) has contemplated "Fixed-Portion Blend Treatment for Psoriasis". Effective corticosteroids are many times the backbone of treatment in psoriasis. Dipro-salic & Neri-salic contain an effective corti-costeroid (beta-methasone di-propionate & di-flucortolone, individually) & salicylic corrosive.

PLANT PROFILE:

Hippophae Rhamnoides L. **(Subspecies – turkestanica)**

Taxonomic status

Division: Magnoliophyta

Class: Magnoliopsida

Order: Elaegnales

Family: Elaeagnaceae

Genus: *Hippophae*

Species: *Rhamnoides*

Subspecies:T*urkestanica*

General description:

Hippophae Rhamnoides L. (SBT) is a miracle plant with tremendous modern applications. It is a deciduous, dioecious, prickly bush viewed as filling wild in the cold dry (calm, dry & cold) climatic circumstances. SBT has a place with the Class Hippophae, which has been gotten from a Latin word 'Hippo' significance horse & 'Phaos' importance sparkle. The plant which makes horse sparkle is Hippophae.

Initially, in view of morphological characters, family Hippophae will answer to in particular have three species:

(i) H. salicifolia D. Don. *(ii) H rhamnoides* L. (iii) *H. tibetana* Schlecht. However, now it has been increased up to seven species and eleven subspecies:

1. *H. goniocarpa.*
2. *H. gyantsensis.*
3. *H. litangensis.*
4. *H. neurocarpa*i.
5. *H. salicifolia.*
6. *H. tibetana.*
7. *H. rhamnoides.*

Subspecies – carpatica, Subspecies – caucasica.

Among every one of the types of SBT, three species in particular Hippophae rhamnoides sp. turkestanica, (in Ladakh and Lahaul-Spiti) & H. salicifolia (in Uttaranchal & North-eastern India) have been accounted for from India. Notwithstanding, H. rhamnoides (subspecies - turkestanica) is the most bounteously developing and generally appropriated species in India.

Phytochemical Profile:

Significantly SBT seed and the delicate part oils contain triacylglycerols. In the seed oils of all significant business subspecies, the really unsaturated fats routinely are lino-leic (39-41%), α-lino-lenic (27-31%), oleic (17-19%), pal-mitic (7-9%), stearic (3%) & vacce-nic acids (2-3%). SBT seed & berry oils are viewed as of specific healthful interest in light of the fact that their n-6/n-3 proportion <2:1 is low, contrasted with most other vege-table oils (16).

Laid out Remedial Purposes:

Anticancer (17), Hostile to Arteriosclerotic (18), Against platelet aggregator (16), Injury recuperating (12), Against ulcer specialist (15).

Fig.1: *Hippophae salicifolia* Plant

3.8.4 *Hippophae salicifolia*

Botanical name: *Hippophae salicifolia*

Vernaculars: Chuk & Tarwaa (Personal communication by DRDO personnel)

Family: Elaeagnaceae

General Description: Dioecious, thorny shrub found growing wildly in the coldarid (temperate, dry & cold) climatic conditions.

Global Demography: The southern slope of Himalayan, Mt. Tibet of China, Bhutan, Nepal, India

Local Demography: Uttaranchal, higher regions of Himanchal Pradesh

Taxonomical Details: Same as that of *Hippophae rhamnoides*

Phytochemical Constituents: Fatty Acids, Carotenoid, Phytosterols, Vit-E, K, 28 trace elements, Tocopherols & Sterols.

Reported Therapeutic Uses: Antioxidant (1, 12), Adaptogenic (14).

Creams:

Creams are the semisolid measurements structures which are exceptionally vulnerable to stage partition, as they are emulsions containing oil in water or w/o. The oil in water creams are liked for interior use since water is scattering medium & oil is scattered stage where as water in oil creams are liked for outside use since oil is scattering medium & water is scattered stage. Oleaginous bases confer tenacity to the creams, where as retention bases bestow delicate quality to the creams. The emulsifiers act at the oil water inter phase and keep them from stage detachment. Dampness holding specialist like glycerol & mannitol keep them from drying even after lengthy term. Anti-microbial specialists, for example, methyl paraben keep them from

microbial assault. These arrangements principally have two qualities i.e, non-abrasiveness (cumbersomeness) and tenacity. The creams have prevailing delicate quality than tenacity subsequently they are eliminated effectively after the finish of wanted restorative impact when applied to skin.

MATERIALS

Table 6: Components will use in Cream Formulations[42]

Emulsifiers	**Buffering agents**
Sorbitan monostearate	Citric acid
Sorbitan monooleate	Phosphoric acid
Sodium lauryl sulfate	Monobasic sodium phosphate
Polyoxyethylene Sorbitanmonostearate	Purified water
Polyoxy-40 stearate	
Polyethylene glycol-100 mono-cetyl Ether	**Polyols (moisture retaining agents)**
Polysorbate-80	Glycerine
Poly-oxy-ethylene Sor-bitan mono Palmitate (Tween40)	Propylene glycol
Tween-20	Propylene glycol4000
Tween80	Propyleneglycol6000
Fat Phase Components	Sorbitol solution
Glyceryl Mono-stearate	
Cetyl alcohol	**Antimicrobial agents**
Spermaceti	Methyl parabens
Stearyl alcohol	Propyl parabens
Stearic acid	Ethyl parabens
Petrolatum	Butyl parabens
Liquid Petrolatum	4-Chloro-m-cresol
Ceto-stearyl alcohol	Thiomersol
Iso-propyl palmitate	Sorbic acid
Squalane	Potassium sorbate
Yellow Beeswax	-
White Beeswax	-

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